

OBSERVATIONS ON THE NESTING OF THE KILLDEER

BY WALTER P. NICKELL

IN the last five years I have recorded a total of 17 nests of the Killdeer (*Charadrius vociferus*) on the Cranbrook Estate in Bloomfield Hills, Michigan. Observations on nine of these nests were cut short by a series of mishaps. In two instances, boys on bicycles rode through the nests, crushing the eggs; football players walked on two nests; the eggs in one nest were very probably overheated by exposure to the sun, for they were located in a dry field, and were left exposed for extended periods during unusually hot weather. Small children took the eggs from one nest, and the remaining nests were also robbed, probably by stray dogs.

During the season of 1942, I was fortunate in discovering eight nests of (presumably) three pairs of these birds within sight of my home, where I was able to observe them two or more times daily. All nests referred to in the following discussion are those observed during the 1942 season.

HABITAT

The nests of all three pairs were found in the athletic fields of Cranbrook School—low, filled in, almost perfectly level fields, kept closely mowed during the Killdeer's nesting season, and bounded on three sides by winding lagoons. Five of the eight nests were located on the white lines of crushed limestone marking the boundaries of the various athletic fields.

NEST

The nests were little more than cavities in the earth or in the crushed rock. No apparent attempt was made to line them (though the power-driven lawn mower threw cut grass over the nests, and this filtered down beneath the eggs after the nests were made). The three nests which were not placed in the crushed rock of marker lines, were located in areas of sparse grass in the clay soil. These nest cavities were an inch to an inch and a half deep at the center, and diameters ranged from five to seven inches.

NESTS OF PAIR ONE

The first of these nests was discovered on April 6 at 9:00 A.M., when the first egg was still warm after deposition. The second egg was laid on April 8 between 11:00 A.M. and 1:00 P.M. Three observations were made between 1:00 P.M., April 8, and the late afternoon of April 9. The nest held only two eggs at the last observation. During the night of the ninth, a heavy snow covered the nest to a measured depth of six inches. On April 10, at 7:00 A.M., and again at noon, I attempted to find the nest, but not even a slight depression was visible in the surface of the snow. Neither of the Killdeer was in evidence in the vicinity. At 4:00 P.M. I found the nest with ease, for in the mean-

time the female had dug down to the eggs and had laid the third egg. Her tracks in the snow showed plainly that she had alighted about 75 yards away and walked directly to the nest site. My own tracks, made previously the same day, circled the nest a few feet away. The Killdeer's tracks indicated that after depositing her third egg, she had left the nest on the opposite side from that of her approach. Somewhat tubular markings at the edge of the excavation were plain evidence that the seven-inch opening to the nest was dug largely with her beak. The

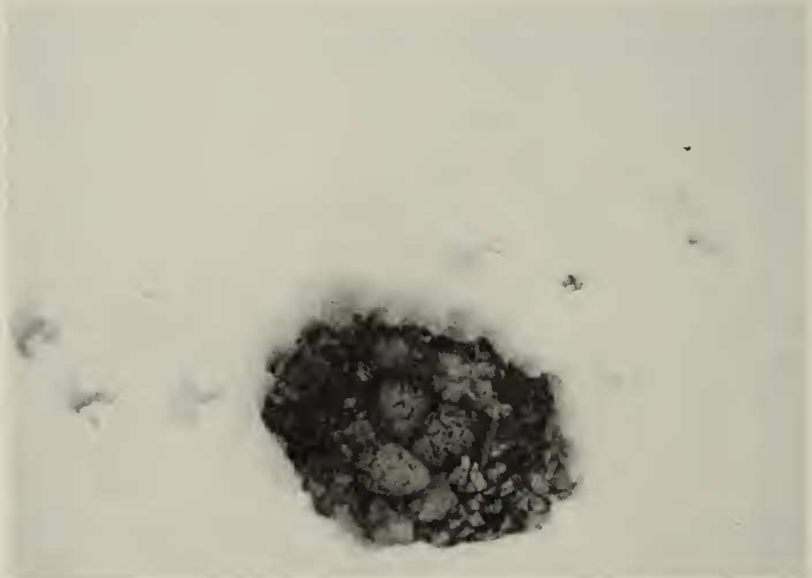


Figure 1. Killdeer nest on April 10 after being cleared of snow by the female.

fourth egg was laid less than 24 hours after the third, between 9:00 A.M. and noon on April 11. Consistent incubation began immediately or shortly afterward, for a bird was near the nest at noon on April 11, and the eggs were warm. At 2:00 P.M. on the same day, the incubating bird left the nest at my approach and ran off a few yards, uttering soft cries, but showed no other signs of distress such as the common "broken-wing" behavior. When I had made my observations and had moved away about a hundred yards, the bird came back quietly and settled upon the eggs, facing directly into a sudden flurry of snow. Observations were made three times daily until 7:30 P.M., April 17, when all eggs had disappeared. During these six days, incubation must have proceeded consistently, since at each observation the eggs were quite warm.

During the 12 days of observation of the first nest, I saw only one

bird at a time, but both were present near the nest site on April 18. At my approach both birds flew about, uttering loud distress cries. Suspecting that they were preparing to nest again soon, I kept the area under close observation. Although both birds were near the original nest site at each visit, I was not able to find the second nest until May 4, when its four eggs had been under incubation for several days. This nest was located on another yard-line, 17 yards from the first. Eight days later a power mower ran across the nest, badly

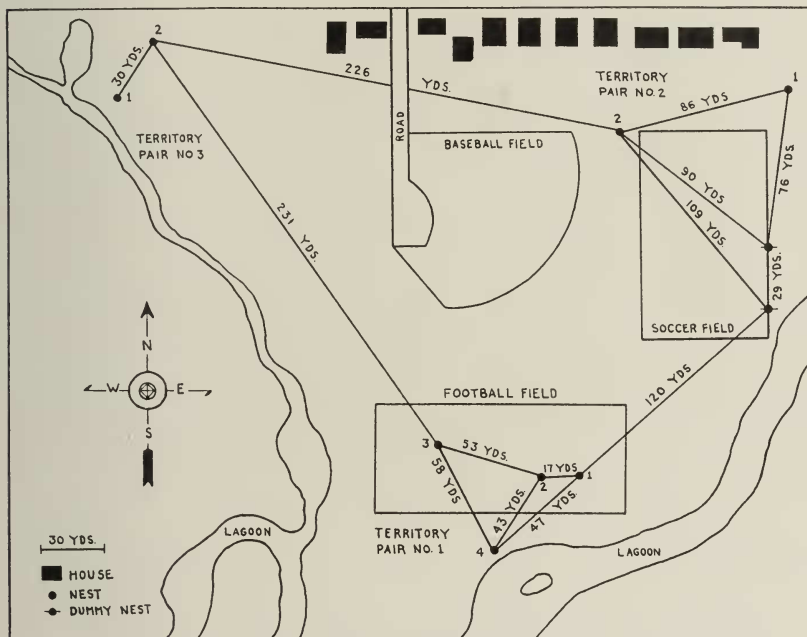


Figure 2. Killdeer nest sites.

cracking two of the eggs and breaking very small holes in the other two. All eggs were allowed to stay in the nest until May 16, when the two badly cracked ones disappeared, probably removed by the parent birds. At 8:00 A.M. on May 20, the young in one of the two remaining eggs could be heard, but had not broken through its shell. No activity inside the other egg was audible. At 6:30 P.M. on May 21, the first egg was pipped in one place. The young could be heard within the shell in the other egg. The first young emerged from its shell at noon on the following day but was quite weak. The second could still be heard. It finally pipped its shell between noon and 5:30 P.M., May 23, when it, as well as the first young, was found dead. The nest was then abandoned, although the adults were seen in the vicinity of the nest site at several subsequent observations.

The third nest, with four eggs, was discovered on June 3, just after the grass mower had crushed its contents. This nest was located on another yard-line, 53 yards from Nest 2. By this time, William Smith, the driver of the grass mower, was watching for a nest, and on June 11 he saw the pair showing great distress at a point near the edge of the football field, where he then found Nest 4. The new nest cavity was in a sparsely sodded spot 58 yards southeast of Nest 3.

The first egg was laid before noon on June 12, the second and third eggs were deposited before noon on June 13 and 14, and the fourth in the afternoon of June 14, some time before 7:00 P.M. Incubation began with the laying of the fourth egg. Daily observations were made through June 26, when I went north for the summer, leaving the final observations to Mr. and Mrs. Felix Bednarz of Birmingham, who were able to make early morning and early evening observations daily. They found three young out of the first laid eggs in the early morning of July 9. The fourth egg hatched during the early morning of July 10. No check was made on the period of parental care, for the parents and young left the immediate vicinity four days after the young hatched.

As will be noted on the accompanying map, the nearest part of the territory of Pair 2 was 120 yards distant, and since only one pair of Killdeer was seen in Territory 1 throughout the season, it is reasonable to assume that all four nests belonged to this pair. Moreover, the only other Killdeer known to be nesting within the boundaries of the Estate were Pairs 2 and 3, and they were occupied with their own family affairs at the time of Pair 1's nesting operations. Gayle Pickwell (1925) believed that one Killdeer he observed laid at least three clutches of eggs from early April to the last of June, and that she may have raised two broods.

NESTS OF PAIR TWO

The first nest of Pair 2 was discovered on May 5, 210 yards north of the first nest of Pair 1. This nest contained five eggs, which hatched in the following order: one young hatched and dry by 9:00 P.M., May 11, two hatched between 1:00 and 8:00 P.M., May 12, and the last two on the early morning of May 14. All of the young were banded, and they left the nest on the early morning of May 15. All were observed feeding with their parents daily, until June 12, when only two were seen. On June 4, I had found, and marked by stakes, three new nest cavities, made in the territory of this pair along the boundary lines of the soccer field. I watched these daily. There was no apparent difference in the cavities to indicate the one to be used. Two were located at distances of 76 and 105 yards south of the first nest of this pair. The other, the one chosen for the second clutch, was 86 yards to the west of the original site. The four eggs were laid as follows: before 8:30 A.M., June 17; before 8:30 A.M., June 19;

before 8:30 A.M., June 21; and in the afternoon of June 22. The two remaining young of this pair were still with their parents in the late afternoon after the fourth egg was laid, but were not seen after that time. These young were able to fly short distances, and I had to chase them down by bicycle in order to check their band numbers. Incubation of the second clutch began either near nightfall or early the next morning after the last egg was laid, for one of the adults was on the nest at 7:00 A.M., June 23, and the eggs were warm. Three eggs (the first laid) hatched before 7:00 A.M., July 16; the fourth egg early the next morning.

PAIR THREE

The third pair of Killdeer was found about 240 yards west of the territory of Pair 2 on May 4, with four young about a week old. These young were banded and observed with their parents until June 7, but were not seen after that time.

On June 17, a nest containing four eggs was found about 30 yards southwest of where the young had been caught and banded on May 4. On June 23 the bird incubating at that time was collected for one of the habitat groups in the Cranbrook Institute of Science. Dissection showed that it was the female. Within twenty minutes another bird, presumably the male, was on the nest, continuing the incubation. The young hatched during July 1, left the nest on July 2, and were under the care of the remaining parent through the last observation on July 13. There is little doubt that this was the second brood of Pair 3, since only one pair of Killdeer was seen at a time in this territory throughout the season.

The difference in behavior of the two incubating birds was notable. The female had been extremely wary and would leave the eggs before the observer came near the nest, running away and calling from a distance. When she was collected, the approach to the nest had to be made from behind thick shrubbery which reached to within 25 yards of the nest location. The "male" was much bolder and invariably remained on the nest until I had approached to within a few feet, when he began circling closely around my feet, spreading his tail and beating the earth with his wings. During this display he uttered loud, piercing, *dee! dee! dee!* calls, interspersed with trilling notes.

DISCUSSION

Bent (1929:207) quotes several published reports on the Killdeer's incubation period. These range from 24 to 28 days. Miles D. Pirnie writes me that he found all four young hatched and away from a nest $23\frac{1}{2}$ days after the last egg was laid. One of these young hatched $22\frac{1}{2}$ days after the last egg was deposited. My own observations show incubation periods ranging from 24 to 26 days. It is possible that the first eggs to hatch in each clutch received some incubation at night

before regular incubation began, although I always found the eggs cold until the last one was laid. A factor which probably contributes to the delay in hatching of the later eggs is the tendency of some parent Killdeers to leave the nest with the first young hatched, allowing the remaining egg or eggs to become chilled. On several occasions, I have found dead young in well-pipped eggs which had been abandoned.

Bent (1929:207) states that both sexes incubate and both take care of the young, and my observations agree. Finally, other observers have reported the Killdeer building incomplete nests near the nest that was actually used.

SUMMARY

At Bloomfield Hills, Michigan, eight nests of three pairs of Killdeer were studied in 1942.

In one nest, the clutch was complete by April 11, an early date for this region. This nest, when it contained only two eggs, was covered overnight with six inches of snow so that the observer was unable to find it, though the Killdeer found it without difficulty, cleared it of snow, and laid the third egg.

There were seven clutches of four eggs, one of five.

Periodicity of egg-laying was found to be variable, not only between females, but in the same individual.

In three nests, incubation began immediately or shortly after the last egg was laid.

The incubation period varied from 24 to 26 days.

When the incubating female was collected at one nest, another bird (presumably the mate) took over the task of incubation.

The period of parental care for two broods was 39 and (about) 42 days.

One female apparently laid four clutches of eggs during the season (April 6 to June 14). The second clutch produced young which died, and the fourth produced young that were perhaps raised successfully.

Two pairs were double brooded.

Three new nests (two unused) were made by one pair before the second nesting.

LITERATURE CITED

BENT, ARTHUR C.

1929. Life histories of North American shore birds. *U. S. Nat. Mus. Bull.*, 146.

PICKWELL, GAYLE

1925. The nesting of the Killdeer. *Auk*, 42:485-96, pls. 21-22.

CRANBROOK INSTITUTE OF SCIENCE, BLOOMFIELD HILLS, MICHIGAN